

Report: Week 4

Soft Prototyping to Final Prototyping

DEP 301: Collaborative Design project

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By group NAN 2.0

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Introduction

This week, we started work by talking to Ecoware to get a better understanding of how manufacture of bagasse packaging works. We then used this to select and develop a final concept. We then decided the measurements of the final product with anthropometry.

Most of this week was spent on fine-tuning the details of the final concept, down to every last groove. We tirelessly sketched during the explorations phase, spent much time deliberating on every little aspect, and finally came up with an amalgamation of all our favourite features, keeping in mind the original check for our product, which included sustainability, covid-safety, and, most importantly, indianness.

Targeted Markets

In our last presentation, there was a little confusion about the market we are targeting, since we had originally started with the dabbawalas. So, this week we spent time to detail out who we are creating this for, who our primary and secondary users would be, and also what unintended scenarios this could be used for.

Our primary market is to be restaurant to home delivery. Since in the post-covid world, people would be stuck at home and craving outside food, but would not go to actually dine in a restaurant because of safety concerns, ordering food in would surge, as a market. So, we thought this would make for a good business model. In this scenario, our users would be the restaurant workers that pack the food, the delivery persons that deliver it, and the customers who finally unpack the tiffin and eat from it. Another reason we chose restaurants, is that right now they serve in plastic packaging, which has no Indian identity. So, our focus was to create a kind of packaging that would establish the Indian identity of the restaurants.

We also kept in mind other scenarios this could be used for, including daily tiffin services, taking food to offices or homes, sending food to friends or relatives, catering to offices or functions, taking food to picnics, and any scenario where you would not want the containers back, like delivering food to a relative in the hospital.

Insights from Ecoware

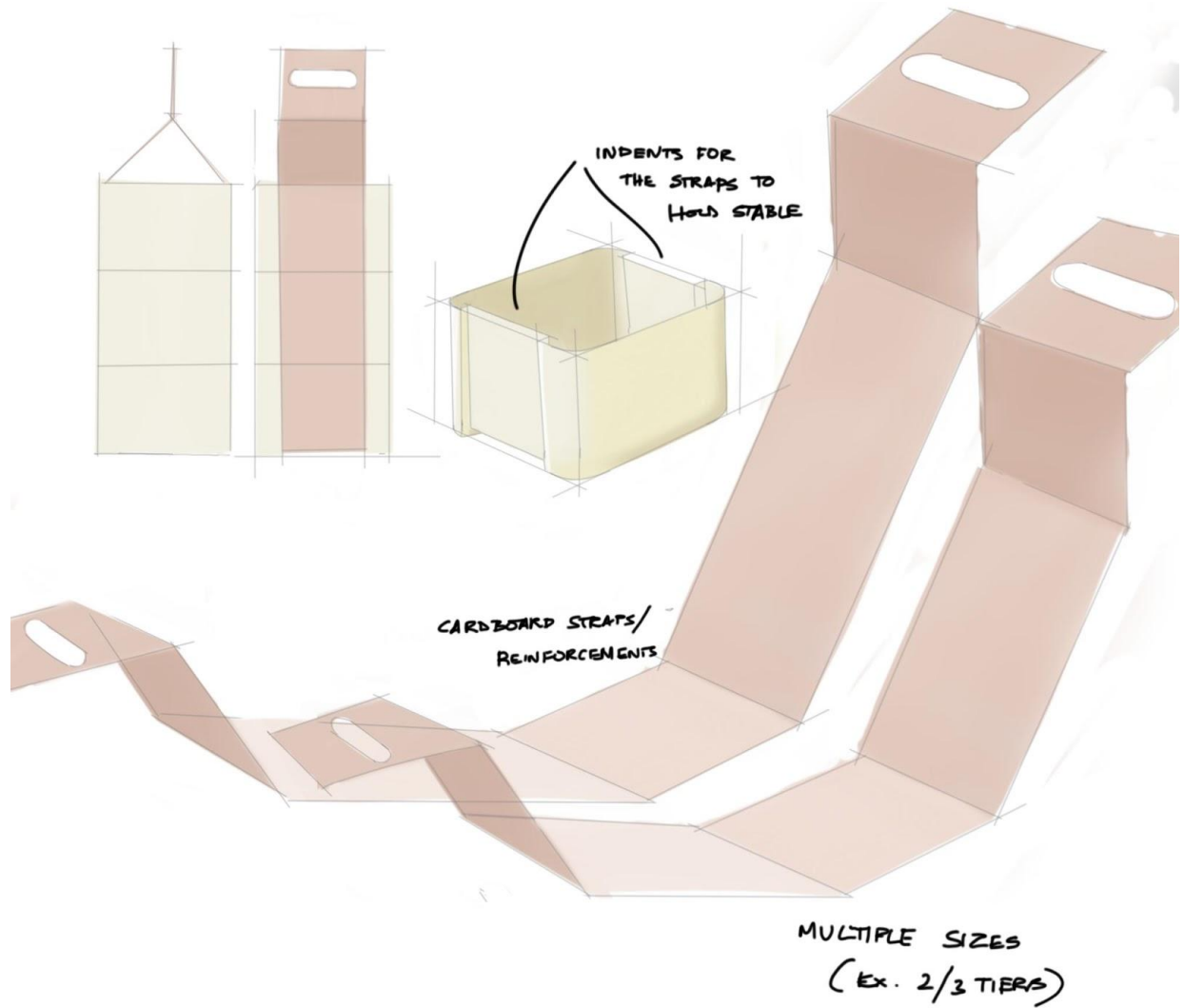
To get a better understanding of how manufacture of bagasse packaging works, we reached out to a company that does exactly that. We set up a meeting with a senior at the company, Mr.

Nishant, who answered our questions and gave us his own tips. Some of the insights we got from this meeting were:

1. Cost of packaging should generally be around 10% of the total food item. Cost of bagasse packaging can be about 5-10% more than the original packaging because customers understand they are paying for quality and eco-friendliness, and are willing to shell out more.
2. We were told to think of USPs. What would make our product different from theirs?
3. We talked about the thickness of the container material, and how that matters. The typical bagasse container would get stained through, if carrying liquids or oily foods, in about an hour. This would change if the container is made thicker.
4. We learnt that bagasse is more friendly than cardboard not only because it degrades quicker, but because it is locally sourced. The raw material is agricultural waste, so not only does it prevent the burning of this waste, it also pays farmers and better their livelihood.
5. We learnt how indents make structures stronger.
6. We learnt about the manufacturing process of the containers, top to bottom. Mr. Nishant explained how bagasse comes to them in sheets of pulp, and how these are ultimately converted into the final product.
7. We understood the purpose of lips in containers, and how clip-lock mechanisms work.
8. Mr. Nishant told us to think about the stability of vertical stacking, a field they have not yet ventured into.
9. We talked about how an eco-friendly, covi-safe container, with an identity of its own, could easily make its way into foreign markets, and talked a bit about how we can make that possible.
10. We also learnt that heat-sealing is possible in bagasse by making a small portion of it non-biodegradable, using adhesive strips.

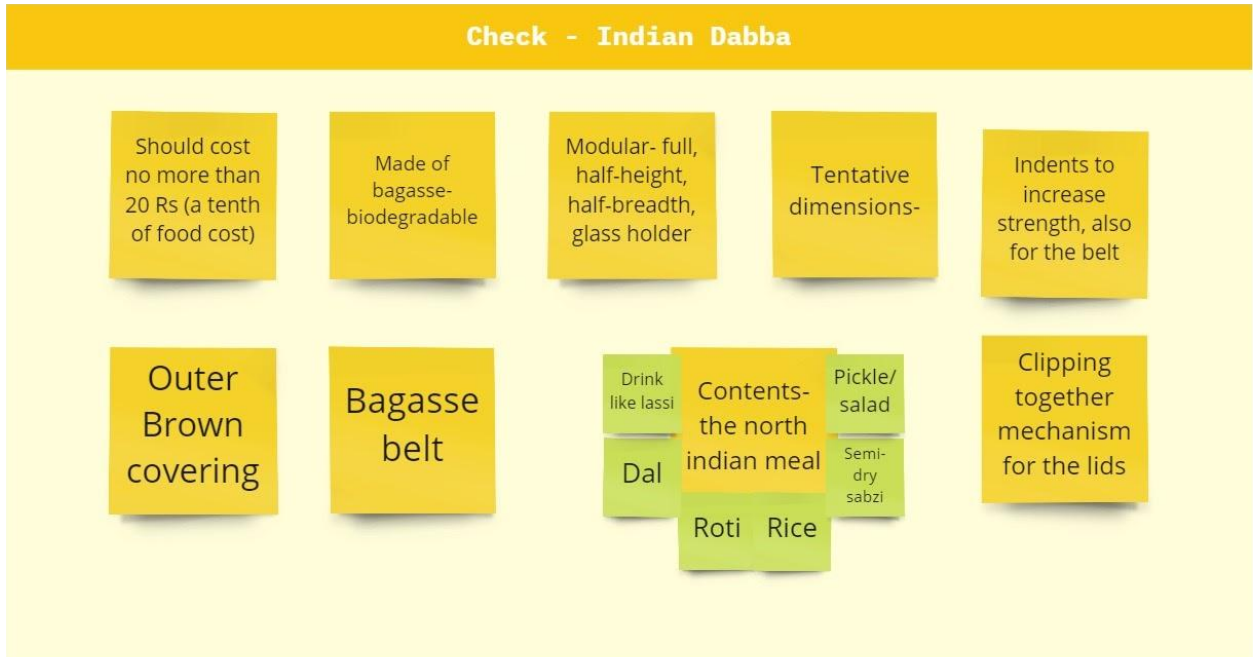
Choosing a Champion Concept

After the talk with ecoware, we deliberated over our champion concepts from last week. We made a list of pros and cons of going forward with each of these, and ended up choosing the stacked dabba as what we will be working on.



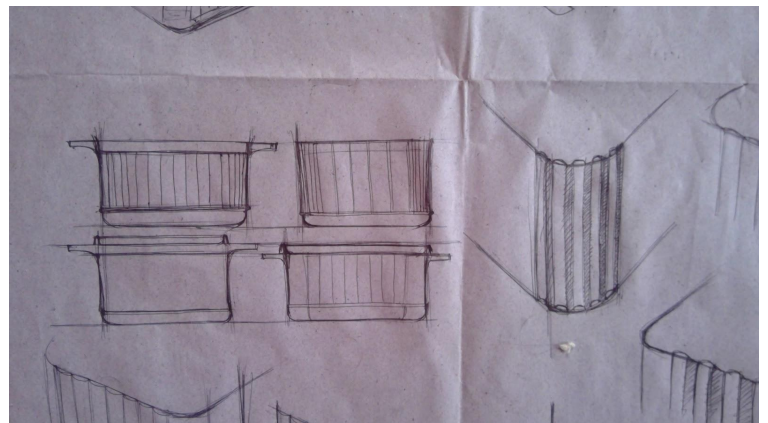
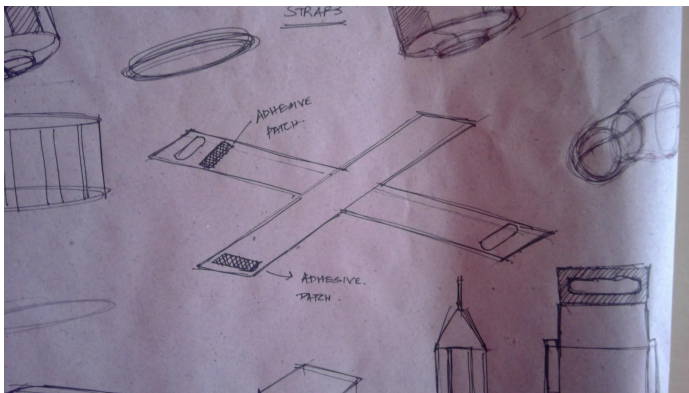
The Check for the Indian Dabba

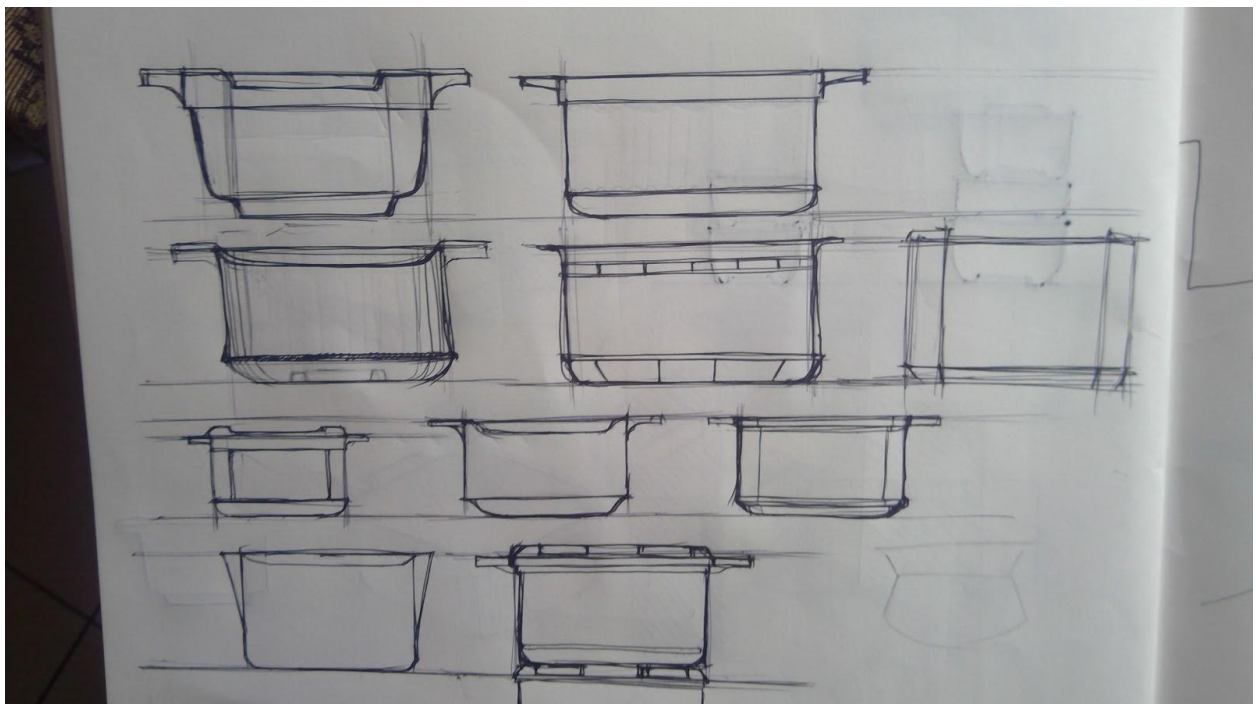
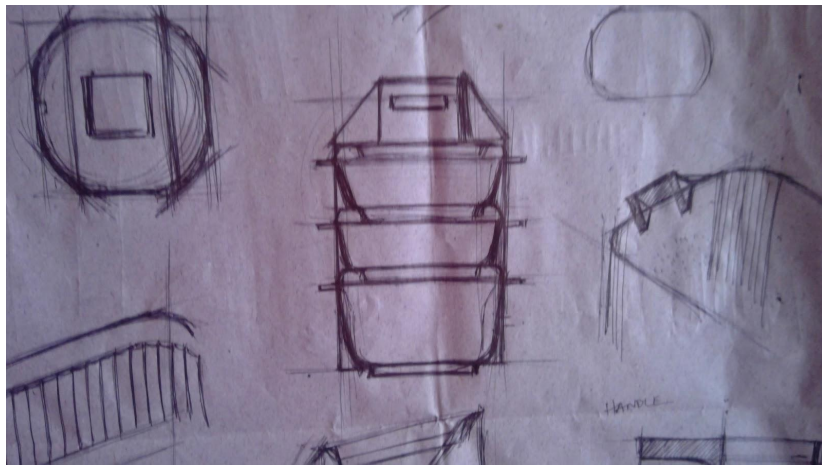
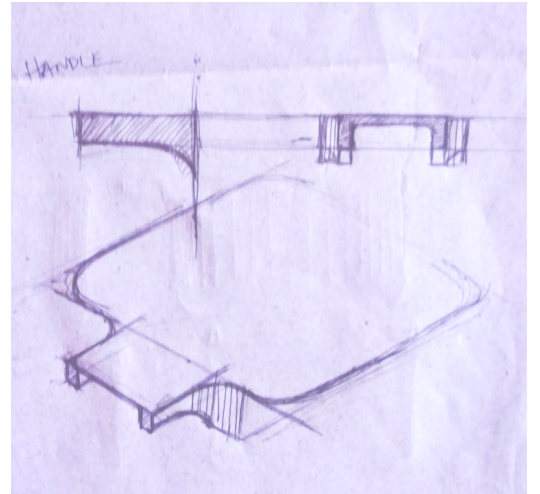
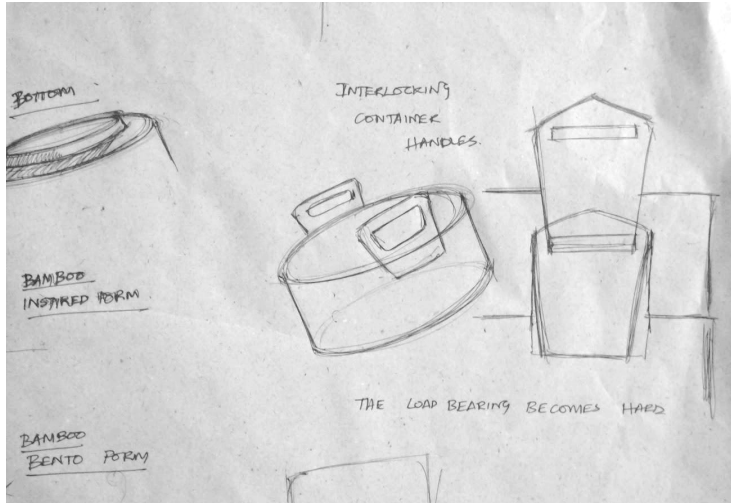
After this, we set about creating the checklist for our final product, listing down the features we would have, and what all we would need to keep in mind.

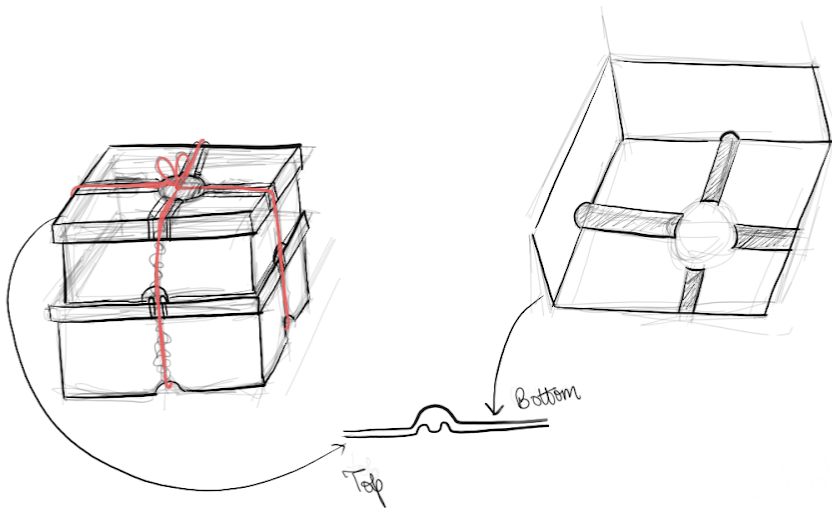
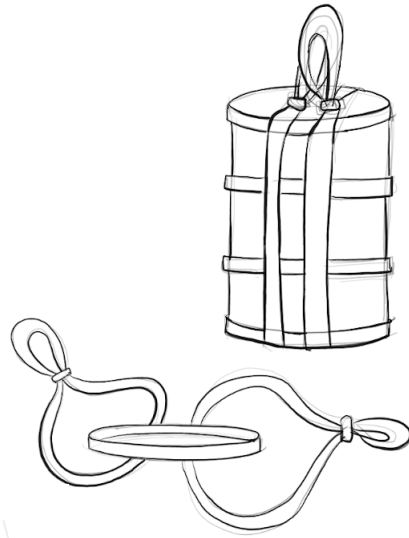
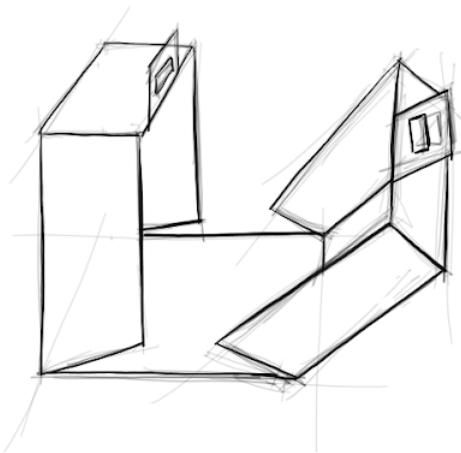


Starting with Explorations

After making the check, we started with sketching out our ideas for each aspect of the container, be it the indian form, the locking or sealing mechanisms, the belt that would hold it all together, etc. These are a few of our sketches:



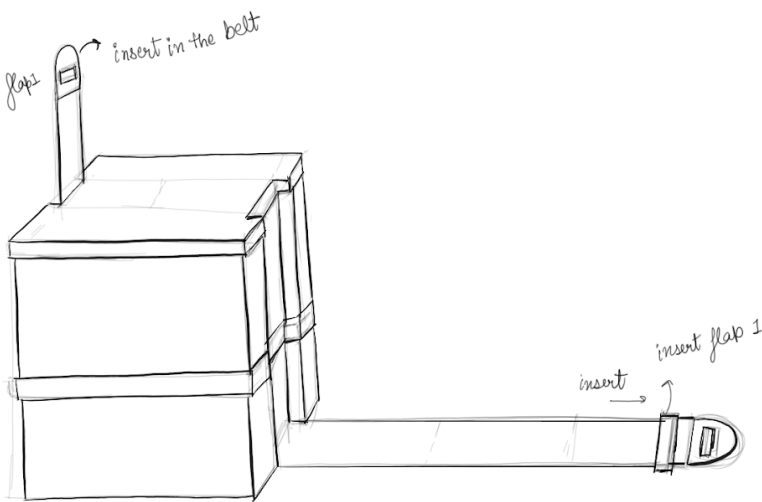




4 or 6 strap supports

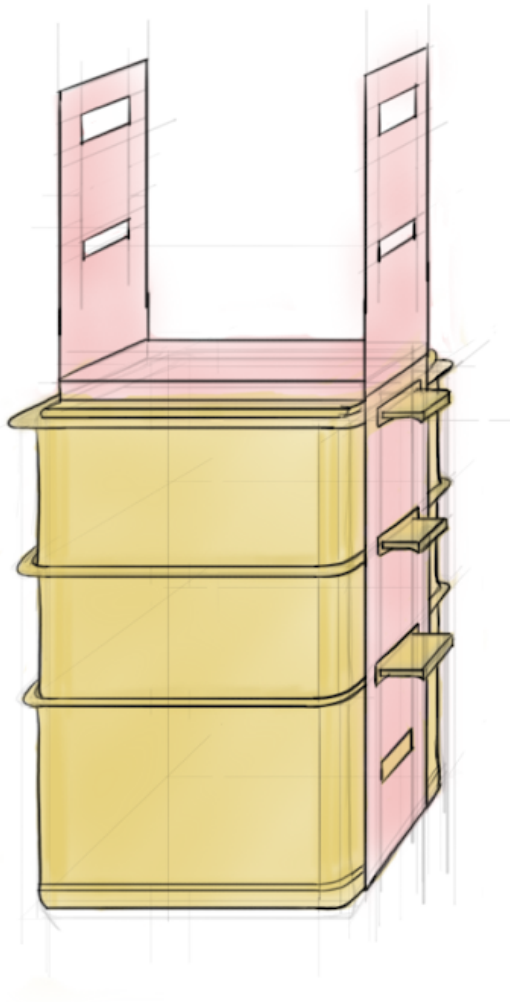


flaps
insert in the belt



Final Concept

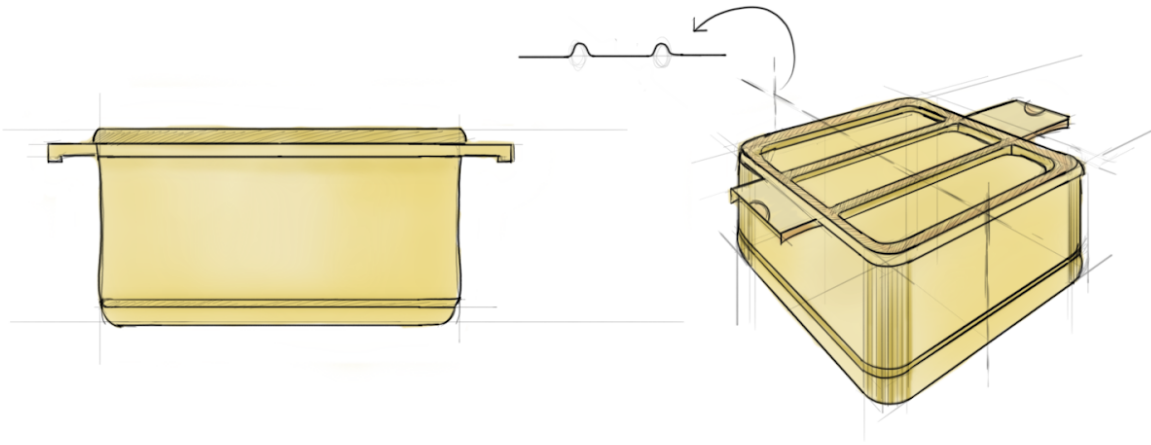
After thorough group discussions, we combined our ideas into the following final concept:



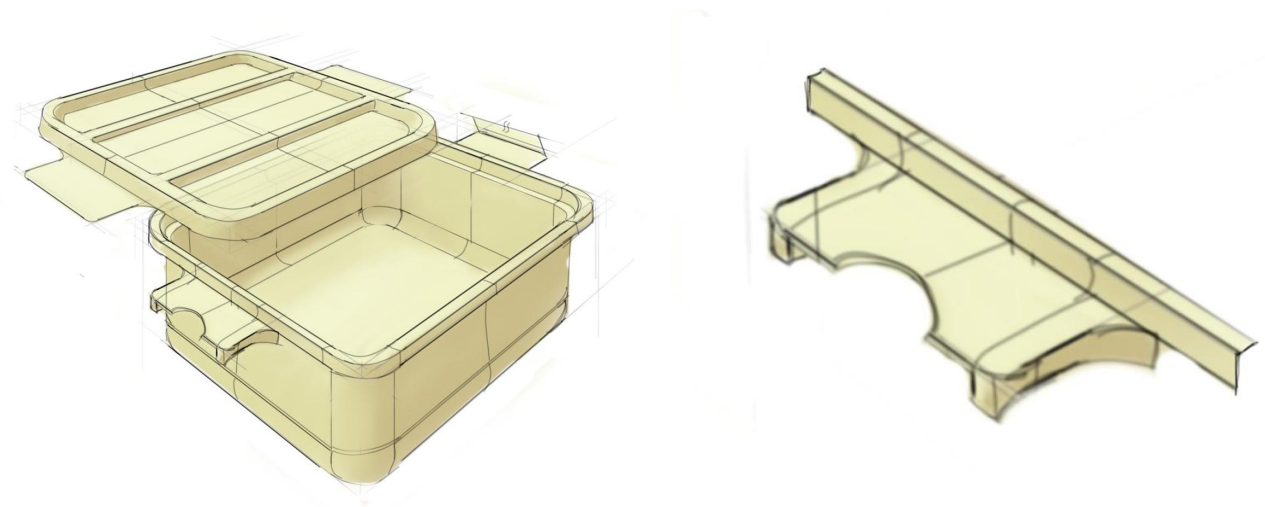
The dabba would consist of stacked rectangular containers, which would be available in multiple sizes. They would be held together by a cardboard strip, which has slits for the handles of the containers to fit and lock into. On top, there would be a cardboard cutlery box, which would also have tabs that fit into the slits, for extra locking support.



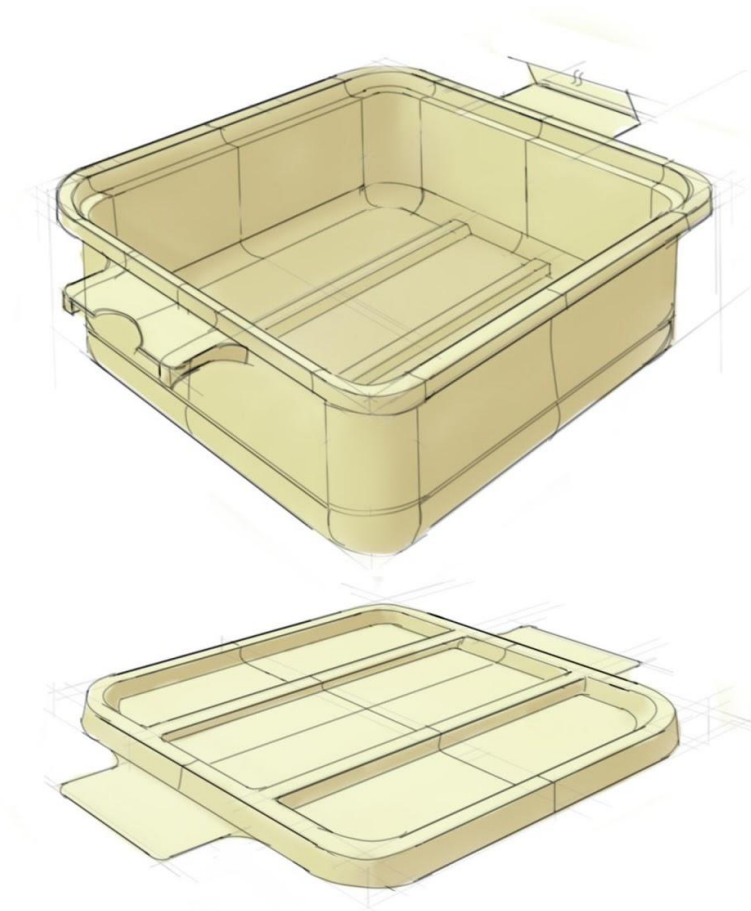
The handle/frame takes inspiration from the traditional Indian dabba. It comes up from the bottom, hold together all individual units, and serves as a handle to hold the whole thing from.



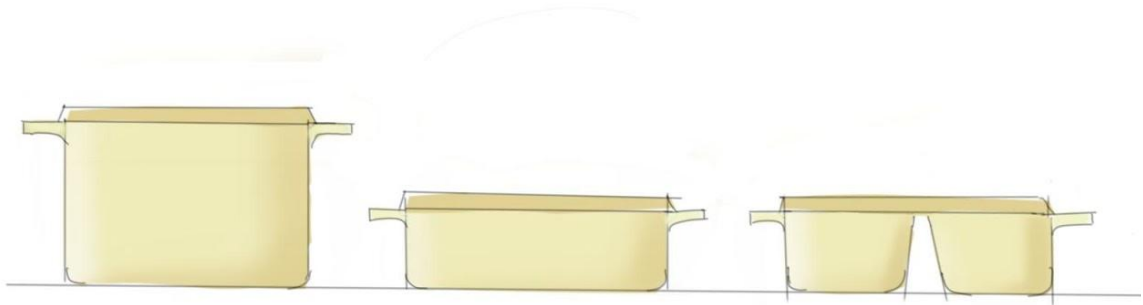
The picture on top is of the individual unit form, of one dabba. The form itself derives from the indian patila form. The handles make it easier to use, and also give it a more indian form.



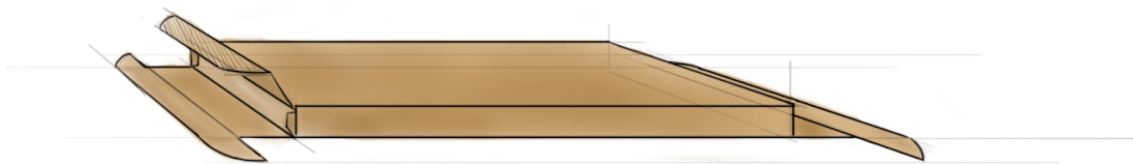
The container would have lips, as shown in the first picture, to enable sealing and to make it leak-proof. It would also have two handles. One would be connected to the lid itself, and the other would have a small groove to fit the thumb into, to make use of the container, especially the opening the lid part, more intuitive.



The lids would have indents running across, from one handle to the next, to help in alignment when stacking. These also make the structure stronger.



The individual units would be available in three forms, to enable modularity. There would be the regular container of 3.5cm height. There would also be the double container of 7cm height, and a container with cups, to fold glasses of chaach or lassi.



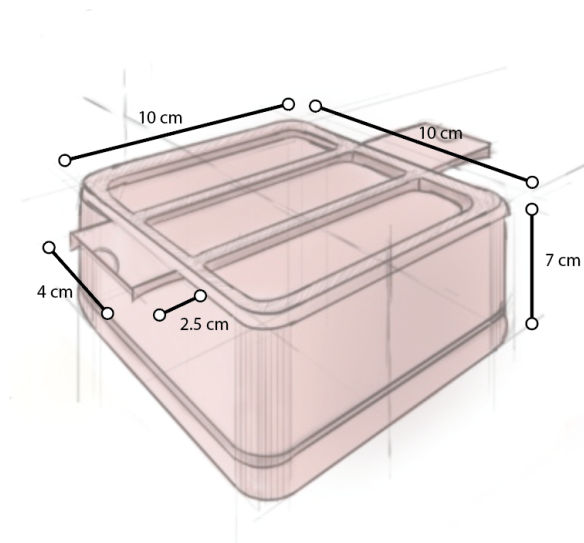
The cutlery box is fairly simple, but also quite crucial to the design. It is a simple cardboard box which comes with pre-packed cutlery, This means that no one would have been in contact with your cutlery before you open it, which provides for safety. The box would also have flaps with foldable tabs, that slip into the slits on the cardboard strap, and lock it together.

Dimensions through Anthropometry

To gather dimensions for our product, we decided to take into account existing products dimensions, since that is what the users would be accustomed to, and also took anthropometric data to set constraints for ourselves. Following is the table we made from anthropometry. The first column shows what dimension it is for, the second shows what data

value we considered, the third shows what percentile we are considering, whether we need to accommodate the largest or the smallest, and the final column shows the actual data value we got, from Dev Kumar Chakraborty's book on anthropometric data.

Dimension	Measurement	Percentile	Value
Height, dabba	Finger length	5th percentile	< 6.9 cm
Width, dabba	Handgrip length	95th percentile	> 6.4 cm
Width, dabba	Handspan	5th percentile	< 9.3 cm
Width, handle	Two-finger width	95th percentile	> 3.4 cm
Length, handle	Phalanx length	95th percentile	> 2.5 cm



The final measurements we decided on were as such: the sides of the square box would be 10cm each. The heights would be either 3.5cm or 7cm. For the handles, the length would be 4cm, and the width, which is how much it protrudes out, would be 2.5cm.

What's Next

For the coming week, we intend to focus on making a properly rendered 3D model of our product, and also on creating a business model for the same.